

REMARKS

Pursuant to 37 C.F.R. §1.111, reconsideration of the instant application, as amended herewith, is respectfully requested. Entry of the amendment is requested.

Claims 23-34 are presently pending before the Office. Claims 23 and 29 are currently amended herein. Claim 24 is canceled herein and claims 25-28 and 30-34 are withdrawn from consideration due to restriction requirement. No new matter has been added. Support for the amendments can be found throughout the specification as originally filed. Applicants are not intending in any manner to narrow the scope of the originally filed claims.

The Examiner's Action mailed February 18, 2003 (Paper No. 31) and the references cited therein have been carefully studied by Applicants and the undersigned counsel. The amendments appearing herein and these explanatory remarks are believed to be fully responsive to the Action. Accordingly, this important patent application is believed to be in condition for allowance.

Applicants wish to respond to the comments made by the Examiner in the Office Action dated February 18, 2003, as follows:

1. Rejection based on 35 U.S.C. 112, first paragraph

(1) In the Office Action (page 3), the Examiner states:

"The paragraph bridging pages 6 and 7 support a composition comprising an epoxy resin, a curing agent and the tetrakisphenol compound of formula (I). There is no support for the claimed epoxy resin being "non-curing" on claim 23, line 2 and claim 29, line 1 since such a term implies the lack of reaction of the epoxy resin with the curing agent at any point which contradicts the claimed "curing agent" or "compound" capable of "reacting with the epoxy group of the epoxy resin to cure the resin" in claim 23, lines 3-4 and claim 29, lines 2-3.

Regarding this point, Applicants have amended the term "non-curing" found in claim 23, line 2 and claim 29, line 1 to the term "an epoxy resin prior to curing". Therefore, Applicants believe the amendment overcomes the rejection mentioned above.

(2) In the Office Action (page 3), the Examiner states:

"page 14, lines 28-30 and page 15, lines 9-13 substantiate the designation of the tetrakisphenol compound of claim 23 as a "curing catalyst" as opposed to the denoted "curing accelerator catalyst."

Regarding this point, Applicants have pointed out in the amendment filed when the RCE was requested (Paper No. 28) and when the amendment for response to the Restriction Requirement was filed (Paper No. 30), that there are descriptions in the specification about the fact that tetrakisphenol compound (hereafter, TEP) itself has catalytic activities as accelerators of curing epoxy resins. The following is a citation of the relevant part from the response filed when requesting the RCE and the amendment filed when responding to the Restriction Requirement.

"The catalytic action of TEP in accelerating the curing is supported from the descriptions in the specification of the present invention.

(1) "the inventors of the present invention found that the tetrakisphenol compound itself has an excellent catalytic action for curing epoxy resins." (page 14 line.6 form the bottom of the English specification).

This description indicates that TEP has a catalytic property of curing epoxy resin by itself, that is, TEP has a property of accelerating the curing by itself.

(2) "((~) and are curable by just heating them up to a certain temperature) to promptly produce a cured-product. The curing of the epoxy resin should not be initiated at a temperature below 80 °C or around. However, the epoxy resin starts curing rapidly when temperature raised to a range of from 100 to 130 °C, which is normally desired for curing." (page 14, lines 7 to 12 of the English specification).

This description shows a catalytic action of TEP itself, a host compound of a clathrate, in accelerating the curing and explains the action of TEP itself that has just lost its guest by having released a curative, a guest compound, from a clathrate, wherein a TEP is a host compound, and further

explains that a curative, a guest, is released from a clathrate when heating the clathrate comprising a curative as a guest compound and a TEP as a host compound to a certain temperature (around 100 to 130 °C), therefore free TEPs (hosts having no guests) and non-clathrated curatives are present in the reaction system, and the free TEPs accelerates the curing of an epoxy resin by non-clathrated curatives, and "promptly produce a cured-product" and as a result, "starts curing rapidly."

(3) "By using the epoxy resin composition according to the present invention containing a tetrakisphenol compound, various curing reactions can proceed faster and smoothly even under a mild condition, which allow to obtain stable cured products, because of the excellent catalytic activity of a tetrakisphenol compound for curing epoxy resins, and the curing property of a resin composition can be extremely improved by using the inventive epoxy resin composition when compared to the curing by using a curative only." (page 15, lines 8 to 15 of the English specification).

The description cited above clearly indicates that TEP itself has a catalytic property of the curing of an epoxy resin. That is, TEP itself has a property of accelerating the curing. It is also mentioned that the curing reactions can proceed faster and smoothly even under a mild condition due to the free TEPs, compared with a curing reaction using curatives alone."

As explained above, we believe it can be understood that the "curing accelerator catalyst" described in the claim is synonymous with the "catalytic action for curing epoxy resins" described in the specification (page 14, lines 27 to 28) and the "catalytic activity a tetrakisphenol compound for curing epoxy resins" described in the specification (page 15, line 13).

However, if the Examiner still believes that the term described in the claim and the specification should be consistent, then, we will amend the terms described in the description mentioned above to "catalytic action for curing epoxy resins (curing accelerator catalyst)" and "catalytic activity a tetrakisphenol compound for curing epoxy resins (curing accelerator catalyst)".

2. Rejection to Claims 23 and 24

(1) In the Office Action (page 5), the Examiner states:

"Claims 23 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Zupancic et al."

As the Examiner stated, it is true that in the prior art mentioned above, Zupancic et al. shows a composition comprising epoxy resin and tetraphenolethane with N-benzyl-dicyandiamide curing agent, and the content of tetrakisphenol is the range of from 0.001 to 0.1 mole per mole of epoxy group.

However, as it is clear from the description in claim 1 and 8, the tetraphenol used in the cited art is blended as a chain extender.

✓ Meanwhile, the present invention, as mentioned above, has a remarkable characteristic in utilizing the curing accelerating activity of the TEP itself (curing accelerator catalyst), that is, in using the catalytic activity that accelerates the curing speed (when the amount of curing agent is the same), in the curing of an epoxy resin. There is no description or teaching regarding a catalytic activity (curing accelerator catalyst) in the curing acceleration of TEP mentioned in Zupancic et al.

Generally, a chain extender is used for the purpose of increasing the molecular weight, and has an active atom. It reacts with an epoxy group of an epoxy resin to form a combination (see http://www.pse.umass.edu/lesser/Students/Calzia/presentations/calzia_cumirp2002-1.pdf). Therefore, free tetraphenolethane as a chain extender is decreased from the reaction system as the curing reaction progresses. However, a catalyst has an activity to accelerate the reaction speed, and exists in the same state before and after the reaction. In other words, a catalyst does not bind

to an epoxy group and its amount does not decrease.

As described above, a chain extender and a catalyst function in a different manner. Therefore, it is clear that novelty and inventive step are found in the present invention, wherein the catalytic activity in the curing acceleration of the tetrakisphenol compound itself (curing accelerator catalyst) is being claimed specifically.

(2) In the Office Action (pages 6 and 7), the Examiner states:

"Claims 23 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Schreiber Patent Nos. 4,246,162 or 4,668,718 or Koike et al. or Dewhirst."

The Examiner states:

"The claimed tetarakisphenol compound designated as a curing accelerator catalyst embraces the 1,1,2,2-tetrakis(hydroxyphenyl)ethane of their designation as a curing accelerator catalyst since in the absence of the catalytic tetrakisphenol content of claim 23, the phenolic hydroxyl groups of the claimed tetrakisphenol are highly reactive with the epoxy resin and are indistinguishable from the prior art 1,1,2,2-tetrakis(hydroxyphenyl)ethane functioning as a curing agent. More favorable consideration would be given with respect to this rejection if the limitations of claim 24 were inserted into independent claim 23 with the cancellation of claim 24."

✓ Regarding this point, Applicants have followed the Examiner's advice and made an amendment to include the limitation of claim 24 regarding the content of the terakisphenol compound to claim 23. Applicants believe that it is clear after this amendment that the tetrakisphenol compound described in claim 23 of the present invention functions as a "curing accelerator catalyst", and is distinct from the function of the "curing agent" of the tetrakisphenol compound described in the prior art.

Please note that the Schreiber patent number 4,246,162 or patent number 4,668,718, and Koike et al., which have been cited as prior arts, have also been cited in the first Office Action (Paper No. 9). However, the Examiner has approved in the next Office Action (March 28, 2001) that the present invention is distinct from the prior arts. For reference, the following is the citation from the Office Action where the Examiner has shown the approval of the present invention.

"since the claims are directed to a clathrate of a tetrakisphenol and an epoxy-reactive compound to form the clathrate. The Schreiber patents and Koike et al. show blends of a tetrakisphenol and 2-ethylimidazole which are not pre-reacted to obtain the clathrate."

CONCLUSION

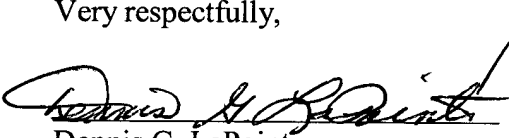
Even though the initial claims in this important patent application were drawn to a new, useful and nonobvious invention, claims 23 and 29 have been amended, and claims 24 has been canceled. Applicants respectfully submit that elected claims 23 and 29, as amended, are patentable over the art of record.

A Notice of Allowance is earnestly solicited.

If the Office is not fully persuaded as to the merits of Applicant's position, or if an Examiner's Amendment would place the pending claims in condition for allowance, a telephone call to the undersigned at (727) 538-3800 would be appreciated.

Very respectfully,

Dated: 5/19/03



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